

School Dental Care in a Community With Controlled Fluoridation

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PREVIOUS STUDIES of accumulated and maintenance dental care needs of school children, such as those conducted in Woonsocket, R.I., and Richmond, Ind. (1-5), have provided communities a basis for estimating dental care requirements in child population groups where the prevalence of caries is high or moderate. Introduction of controlled fluoridation to a public water supply, however, can create a situation to which the aforementioned studies are not applicable for forecasting dental needs of children.

This report is based on a study of regular clinical maintenance care needs of the school population of Gainesville, a city of moderate size in north central Florida, which had been controlling the fluoride level of its drinking water at 0.8 ppm since 1949. Our study, started in January 1954 and completed in 1959, 5½ years later, was made to determine the level and character of dental needs of children and the professional time and service required to meet these needs in a community having the benefit of water fluoridation. The Gainesville school system offered a group of approximately 5,000 children who were experiencing steadily diminishing dental care requirements. Our

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study was designed to provide complete dental care, except orthodontics, for all children having parental consent in grades one through six.

Each school was visited four times, in turn, during this study. The first treatment series required 17 months, the second took 18½ months, and the third required 16 months. After completion of the accumulated backlog of dental care, the time element was gradually reduced to 14 months for the fourth series.

A cooperative project of the Alachua County Health Department, the Gainesville Board of Public Instruction, and the Public Health Service, the program also was supported and assisted by the Florida State Health Department, State and local dental societies, and the parent-teacher association.

Facilities and Personnel

It was apparent from the beginning that the rapidly expanding school population would prohibit the allocation of suitable space to house a dental clinic in all schools. Thus the Alachua County Health Department provided a new structure, approximately 26 by 36 feet, to serve as a portable clinic building that could be moved from school to school as required. It was designed to provide maximum light to work areas, a well-engineered laboratory storage area, a darkroom, space for six dental units, a place for record keeping and administration, and a reception area. Equipment was supplied by the Public Health Service.

Basic equipment for each of the dentists assigned to the project included two standard dental units with lights, air, automatic water

spray attachments, and handpieces that permitted up to 24,000 revolutions per minute; two junior-size chairs with double operating stools; and one cabinet with quadruple sets of instruments. An X-ray machine, an autoclave, a cabinet equipped for surgical procedures, and the usual items of basic equipment completed the clinic.

The county health department made permanent installation of plumbing and utility lines at each school to simplify connection to the clinic building. It also bore the cost of each move, including the connecting of utilities. A local firm moved the building 19 times during the project with no damage to structure or equipment. Each move was completed in 2 days and required only secure fastening or packing of loose or easily damaged equipment and supplies. The fixed clinic arrangement provided the advantage of maintaining established work patterns at all schools, thus promoting efficiency of personnel.

Based on the formula for maximum use of auxiliary personnel derived from the Richmond and Woonsocket studies, the clinic staff consisted of two dentists and three dental assistants throughout the program. These were supported by part-time clerks, a dental health educator, a board of instruction employee to assist in coordinating clinic activities with the school program, and dental students during the summer months. All were indoctrinated in the team concept of dental treatment.

A high level of consistency in examination and treatment procedure was made possible by a low turnover in professional personnel during the study. The director remained with the project for its duration and only three changes were made in the other dental position during 5½ years.

A comprehensive communications program with various segments of the population was conducted throughout the project. Each school was visited before arrival of the clinic, and educational materials were displayed in each institution. Talks with parent-teacher groups conveyed the benefits of good oral hygiene and regular dental care and invited the cooperation of those who would be directly responsible for the participation of the children and, ultimately, the success of the program. The com-

munity at large was kept informed of the program objectives and progress through newspaper articles.

The dental society, invited to observe the project and constantly informed of its progress, supported fulfillment of study goals.

Clinic Operation

The clinic was operated on a year-round basis through the establishment of an appointment system during holidays and summer vacations.

Treatment was begun immediately after all children in a school had been examined. In the first series, emphasis was placed on repair of accumulated defects in permanent teeth. Occasional selective treatment of primary teeth was provided for relief of pain or when it was considered essential for retention of the arch for subsequent permanent tooth eruption and to insure early care of permanent teeth.

During the second phase, when only incremental dental care of permanent teeth was needed by those who had participated in the first series, the backlog of treatment required in primary teeth was completed. In the third and fourth series, when dental care for all regular participants was on an incremental basis, kindergarten children were included as time permitted.

Each successive treatment series saw large numbers of new participants introduced into the program. These were first-graders in the school system or new arrivals in the community.

Records

A dental examination card, maintained for each child for each treatment series, provided identifying information, date of examination, and date on which treatment was completed. The condition of each permanent and deciduous tooth and tooth surface was recorded on the face of the card, and the reverse side was used to indicate treatment.

Residence histories to determine past water consumption were obtained from the parents so that resource requirements for resident children might be available separately from those for nonresidents. However, this report deals only with total treatment given to all children in the

school system. A subsequent report will present separate findings for those children who have been defined as residents of the Gainesville water supply area.

Daily records of chairside time and dental care completed were maintained for each dentist, and these were combined into biweekly reports. Thus, accurate administrative records were compiled as a basis on which the course of the study could be directed.

Prevalence Findings

From 4,400 to 5,400 children, ranging in age from 5 to 13 years, were examined during each of the 4 treatment series. Eighty-eight percent elected to participate in the clinical care program and were given dental prophylaxis and treatment as required; the remainder elected to continue with their private dentists. Participants and nonparticipants are shown by race in table 1.

While total participation was encouragingly high in all schools throughout the program, Negro children, who had little record of previous dental treatment, were more likely to participate than were white children. When clinic participation data for the four treatment series were averaged, 98 percent of all Negro children were found to have participated as compared with 84 percent of white children.

White children comprised about 70 percent of the patient load and a much larger percentage of the treatment load since Negro children had one-third fewer decayed, missing, or filled (DMF) teeth than did white children.

Table 1. Number of 5- to 13-year-old children examined, all treatment series, by patient status and race, Gainesville, Fla., 1954-59

Treatment series	All children	Participants	Nonparticipants
<i>White</i>			
First.....	3, 193	2, 738	455
Second.....	3, 264	2, 748	516
Third.....	3, 858	3, 222	636
Fourth.....	3, 985	3, 298	687
<i>Negro</i>			
First.....	1, 190	1, 179	11
Second.....	1, 286	1, 255	31
Third.....	1, 554	1, 519	35
Fourth.....	1, 418	1, 369	49

To point up racial differences in dental needs which account for important treatment considerations, data for white and Negro children are presented separately. Figures are rounded to the nearest tenth in compiling rates with the result that the components of DMF rates are not necessarily additive to the total.

Because the age distribution of the child groups in each of the four series varies, comparison of changes in dental caries prevalence throughout the study is illustrated here by selection of a single age-race group, white children who were 8 years old in each of the four treatment series. Progressive changes noted in permanent and deciduous dentition in successive treatment series result from two factors. First, regular dental care would be expected, in time, to reduce the number of teeth lost owing to caries, to decrease the number of carious teeth, and to increase the number of filled teeth. Second, Gainesville had been fluoridating its drinking water for more than 4 years when the study began. Thus, at the beginning of the study, 8-year-olds who were resident since birth did not have the caries-preventive benefit of fluoride during the first few years of their lives. By the fourth and final treatment series, controlled fluoridation had been operative for nearly 10 years, and full benefits would have been derived by all 8-year-olds who had lived in Gainesville since birth.

The increasing effectiveness of fluoridation during the course of the study is illustrated by the increase in proportion of 8-year-old white children whose permanent teeth were caries free: 22 percent in the first series, 27 percent in the second, 36 percent in the third, and 43 percent in the fourth. During this interval the DMF rate for these children showed a decrease of 42 percent.

Benefits of the treatment program in reducing the backlog of needed dental care are illustrated by reduction in the proportion of DMF teeth requiring restoration. In the first series, the proportion of DMF teeth needing fillings reached a high of 88 percent, but by the final series the proportion had been reduced to 57 percent. This latter percentage represented eight-tenths of a tooth, a residual occurring largely in the sizable group of children whose treatment remained incomplete because they had

Table 2. Dental caries prevalence rates in permanent teeth of children, 5 to 13 years old, all treatment series, by age and race, Gainesville, Fla., 1954-59

Age last birthday	White						Negro					
	Number teeth per child						Number teeth per child					
	Number examined	Carious only	Filled only	Carious and filled only	Missing	DMF	Number examined	Carious only	Filled only	Carious and filled only	Missing	DMF
1st Treatment Series												
5-13	3, 193	2.6	0.4	0.3	0.1	3.4	1, 190	2.3	0.0	0.0	0.0	2.3
5	61	.3				.3	3					
6	546	.7	.0	.0		.7	168	.7				.7
7	571	1.6	.1	.1	.0	1.8	197	.9				.9
8	488	1.9	.3	.2	.0	2.4	200	1.6	.0	.0		1.6
9	451	2.2	.6	.4	.0	3.2	174	2.0			.0	2.0
10	448	2.7	.7	.4	.1	3.9	153	2.6			.0	2.6
11	445	2.9	.9	.5	.1	4.4	160	3.2	.0		.0	3.2
12	143	4.8	.9	.6	.1	6.4	102	4.3		.0	.0	4.3
13	40	6.0	.5	.2	.3	7.0	33	5.7			.0	5.7
2d Treatment Series												
5-13	3, 264	0.9	1.6	0.2	0.1	2.8	1, 286	0.9	1.0	0.2	0.1	2.1
5	9	.1	.2			.3	48	.3				.3
6	407	.5	.0	.0		.5	195	.3				.3
7	522	.9	.3	.0		1.2	202	.5	.1	.0		.6
8	576	.9	.9	.2	.0	2.0	232	.6	.6	.1	.0	1.3
9	523	.8	1.6	.3	.0	2.7	195	.8	1.0	.1	.1	2.0
10	455	.9	2.2	.3	.0	3.4	176	.6	1.4	.2	.0	2.2
11	454	1.1	2.8	.4	.1	4.4	147	1.2	1.6	.2	.1	3.1
12	276	1.0	3.3	.4	.2	4.9	57	1.5	1.9	.3	.2	3.8
13	42	2.2	3.5	.2	.2	6.1	34	2.2	2.4	.5	.3	5.4
3d Treatment Series												
5-13	3, 858	0.7	1.5	0.2	0.1	2.5	1, 554	0.6	1.0	0.1	0.1	1.8
5	315	.0	.0			.0	118	.0				
6	511	.2	.0			.2	200	.1				.1
7	545	.6	.3	.0	.0	.9	235	.3	.1	.0		.4
8	562	.7	.9	.1	.0	1.7	231	.4	.3	.1	.0	.8
9	571	.6	1.5	.2	.0	2.3	235	.5	.8	.1	.0	1.4
10	580	.7	2.0	.3	.0	3.0	215	.5	1.4	.2	.0	2.1
11	508	.8	2.5	.3	.1	3.7	173	.7	1.7	.2	.1	2.7
12	226	.8	3.2	.3	.1	4.4	115	1.2	2.4	.3	.2	4.1
13	40	2.1	3.5	.2	.3	6.1	32	1.7	2.4	.2	.5	4.8
4th Treatment Series												
5-13	3, 985	0.7	1.3	0.2	0.1	2.3	1, 418	0.4	1.0	0.1	0.0	1.5
5	115	.0	.0			.0	1					
6	539	.2	.0	.0		.2	152	.2	.0			.2
7	625	.6	.2	.0	.0	.8	216	.3	.1	.0		.4
8	557	.7	.6	.1	.0	1.4	243	.2	.3	.1		.6
9	593	.7	1.2	.2	.0	2.1	232	.3	.7	.1	.0	1.1
10	582	.6	1.7	.3	.1	2.7	211	.4	1.0	.1	.0	1.5
11	644	.7	2.4	.3	.1	3.5	195	.6	1.7	.1	.0	2.4
12	284	1.0	2.6	.3	.1	4.0	117	.7	2.4	.2	.0	3.3
13	46	2.0	3.1	.5	.1	5.7	51	1.1	2.6	.3	.1	4.1

moved from Gainesville before their dental care was finished, or among those who declined treatment from their private dentist as well as from the clinic.

Dental caries prevalence rates in the permanent dentition for all ages are shown in table 2. Figures 1 and 2 show the relative growth in the filled tooth component during the four treatment series. Findings are also presented for caries in the deciduous dentition (table 3). These data show improvement but not the progressive improvement observed in the permanent teeth. Among 8-year-old white children, carious deciduous teeth comprised more than three-fourths of decayed, extraction-indicated, and filled (def) teeth in the first and second treat-

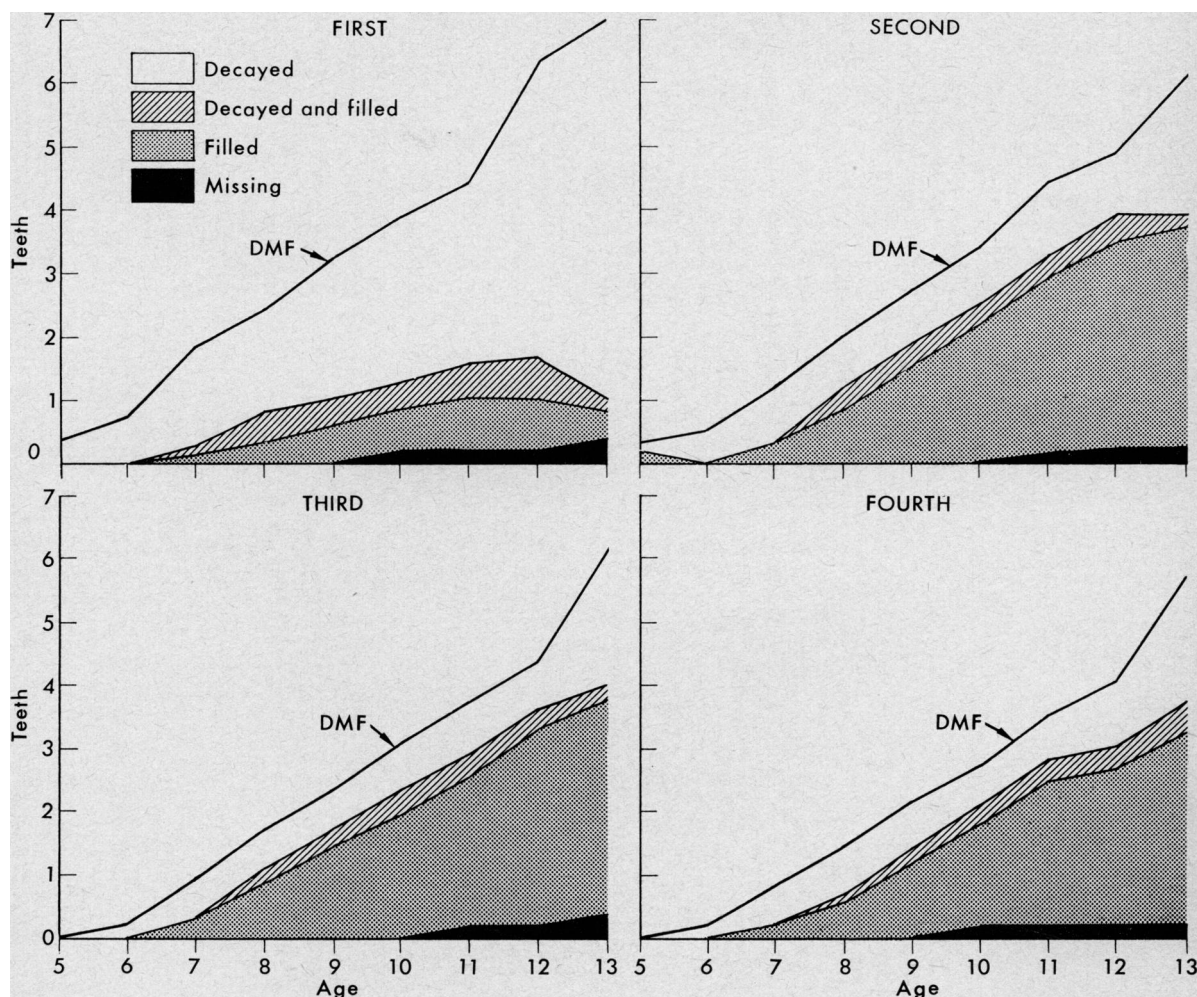
ment series and about two-fifths in the third and final series. The def rate among these children remained essentially unchanged throughout.

Treatment

During the first treatment series, with about 4,000 children under treatment, more than 9,000 permanent teeth were restored, 1 in 30 requiring pulp therapy. Nearly 250 permanent teeth were extracted. Selective treatment of primary teeth resulted in about 250 fillings and 675 extractions.

In the second treatment series, with approximately the same number of children under treat-

Figure 1. Dental caries prevalence in permanent teeth of white children, 5 to 13 years old, in four treatment series, Gainesville, Fla., 1954-59



ment, less than half as many permanent teeth (4,050) required restoration. With the burden of backlog care of permanent teeth thus eased, treatment time was devoted to correction of accumulated defects in primary teeth. Restorations were placed in nearly 5,000 primary teeth, with 1 in 13 of these requiring pulp therapy. About 1,100 primary teeth were extracted.

The third treatment series had nearly 1,000 more children in the treatment program, but the number of permanent teeth filled was less than in the second series (3,237). Of these, 1 in 60 required pulp therapy. One thousand more primary teeth than permanent teeth were filled.

In the fourth series, with a participant population similar to that of the third series, 3,400

permanent teeth and the same number of primary teeth were restored. In the third and fourth series, extractions and pulp therapy were reduced to a minimum.

Data on treatment of permanent and primary teeth are shown in tables 4 and 5.

Years of Using Fluoridated Water

Gainesville was deliberately chosen as the site of this project because the city had recently commenced fluoridation, and steadily decreasing rates of dental caries prevalence in the child population could be anticipated. The amount of decrease would be consistent with the age of each child and his years on fluoridated water.

Figure 2. Dental caries prevalence in permanent teeth of Negro children, 5 to 13 years old, in four treatment series, Gainesville, Fla., 1954-59

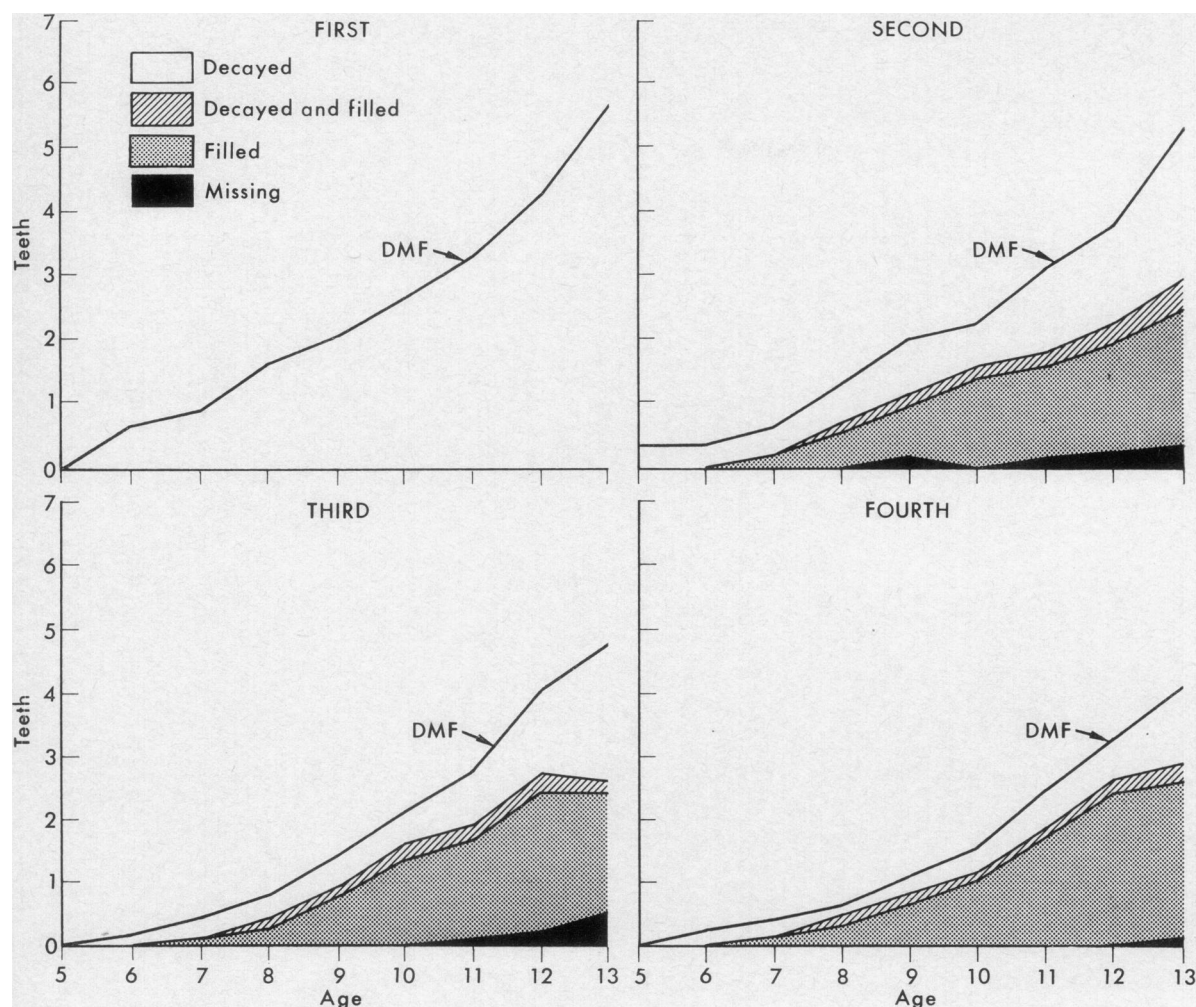


Table 3. Dental caries prevalence rates in primary teeth of children, 5 to 13 years old, all treatment series, by age and race, Gainesville, Fla., 1954-59

White						Negro				
Number of teeth per child						Number of teeth per child				
Age last birthday	Cariou only	Filled only	Cariou and filled only	Extractions indicated	def	Cariou only	Filled only	Cariou and filled only	Extractions indicated	def
1st Treatment Series										
5-13-----	2.2	0.6	0.2	0.2	3.0	2.8	0.0	0.0	0.4	2.8
5-----	3.2	.6	.2	.2	4.0	6.0	-----	-----	.3	6.0
6-----	3.5	.7	.3	.3	4.5	3.9	-----	-----	.2	3.9
7-----	3.4	1.0	.3	.3	4.7	4.2	.0	.0	.5	4.2
8-----	3.1	1.0	.3	.4	4.4	4.0	.0	.0	.5	4.0
9-----	2.6	1.0	.3	.4	3.9	3.6	.0	.0	.8	3.6
10-----	1.8	.6	.2	.2	2.6	1.9	-----	-----	.5	1.9
11-----	1.1	.2	.1	.2	1.4	.8	-----	-----	.2	.8
12-----	.7	.1	.1	.1	.9	.5	-----	-----	.2	.5
13-----	.2	.1	.1	.1	.4	.4	-----	-----	.0	.4
2d Treatment Series										
5-13-----	1.7	0.6	0.1	0.2	2.4	2.1	0.0	0.0	0.3	2.1
5-----	.6	.3	-----	.1	.9	2.2	-----	-----	.0	2.2
6-----	3.2	.8	.1	.2	4.1	3.0	-----	-----	.3	3.0
7-----	2.9	.9	.2	.3	4.0	3.5	-----	.0	.4	3.5
8-----	2.8	1.0	.4	.4	4.2	3.9	.0	.0	.6	3.9
9-----	2.3	1.0	.2	.2	3.5	3.1	.1	.0	.7	3.2
10-----	1.7	.8	.2	.2	2.7	1.9	.0	.0	.3	1.9
11-----	.8	.4	.1	.1	1.3	.8	.0	-----	.2	.8
12-----	.4	.2	.1	.1	.7	.3	-----	-----	.1	.3
13-----	.1	-----	-----	-----	.1	.2	-----	-----	.1	.2
3d Treatment Series										
5-13-----	1.2	1.1	0.2	0.1	2.5	1.4	0.5	0.1	0.2	2.0
5-----	1.8	.8	.2	.1	2.8	2.8	-----	-----	.1	2.8
6-----	2.5	1.0	.2	.2	3.7	2.6	.0	-----	.2	2.6
7-----	2.2	1.6	.3	.2	4.1	2.1	1.0	.3	.3	3.4
8-----	1.5	2.3	.4	.2	4.2	1.4	1.6	.3	.3	3.3
9-----	1.2	2.0	.3	.1	3.5	1.2	1.3	.2	.2	2.7
10-----	1.0	1.4	.3	.1	2.7	.9	.6	.1	.1	1.6
11-----	.7	.5	.1	.1	1.3	.6	.1	.0	.1	.7
12-----	.2	.2	.1	.0	.5	.5	.0	.0	.1	.5
13-----	.0	.1	-----	-----	.1	.1	-----	-----	.0	.1
4th Treatment Series										
5-13-----	1.2	1.2	0.3	0.1	2.7	0.8	1.2	0.1	0.0	2.1
5-----	2.1	.8	.2	.1	3.1	-----	4.0	-----	-----	4.0
6-----	2.5	1.2	.3	.2	4.0	2.5	.8	.1	.1	3.4
7-----	2.0	1.7	.5	.2	4.2	1.6	1.2	.1	.1	2.9
8-----	1.3	2.4	.4	.1	4.1	.9	1.9	.2	.1	3.0
9-----	1.2	2.2	.4	.1	3.8	.9	1.6	.1	.1	2.8
10-----	.9	1.4	.3	.1	2.6	.6	.8	.1	.0	1.5
11-----	.5	.6	.2	.0	1.3	.4	.4	.1	.0	.9
12-----	.4	.3	.1	.0	.8	.3	.1	.0	.0	.4
13-----	.1	.1	.0	.0	.2	.1	-----	-----	.0	.1

Table 4. Dental treatment to permanent and primary teeth of white children, 5 to 13 years old, all treatment series, by age, Gainesville, Fla., 1954-59

Age last birthday	Number of children treated	Number of teeth per child					
		Permanent teeth			Primary teeth		
		Filled	Filled surfaces	Extracted	Filled	Filled surfaces	Extracted
1st Treatment Series							
5-13	2, 738	2. 8	4. 2	0. 1	0. 1	0. 1	0. 1
5	51	. 4	. 5	-----	. 1	. 1	. 0
6	468	. 7	1. 0	-----	. 2	. 3	. 1
7	486	1. 7	2. 4	. 0	. 2	. 4	. 1
8	437	2. 1	3. 8	. 0	. 1	. 2	. 2
9	369	2. 6	4. 2	. 1	. 0	. 0	. 2
10	384	3. 2	3. 8	. 1	. 0	. 0	. 2
11	380	3. 5	5. 5	. 1	-----	-----	. 1
12	127	5. 4	8. 3	. 2	-----	-----	. 1
13	36	6. 0	8. 8	. 3	-----	-----	. 0
2d Treatment Series							
5-13	2, 748	1. 1	1. 4	0. 0	0. 9	1. 7	0. 2
5	7	-----	-----	-----	. 3	. 4	. 1
6	362	. 4	. 5	-----	2. 3	4. 4	. 2
7	450	. 9	1. 1	. 0	2. 2	4. 2	. 3
8	491	1. 1	1. 4	. 0	2. 0	3. 8	. 4
9	434	1. 1	1. 6	. 0	1. 1	2. 1	. 2
10	372	1. 2	1. 7	. 0	. 3	. 6	. 2
11	367	1. 5	2. 1	. 0	. 0	. 1	. 1
12	228	1. 4	1. 8	. 0	. 0	. 0	. 0
13	37	2. 1	2. 8	. 0	-----	-----	. 0
3d Treatment Series							
5-13	3, 222	0. 9	1. 2	0. 0	0. 9	1. 7	0. 1
5	251	. 0	. 1	-----	1. 2	1. 5	. 1
6	428	. 2	. 3	. 0	1. 7	3. 1	. 2
7	470	. 6	. 8	. 0	2. 1	4. 2	. 2
8	479	. 8	1. 1	. 0	1. 8	3. 5	. 2
9	484	. 8	1. 0	. 0	1. 1	2. 1	. 1
10	473	1. 0	1. 3	. 0	. 3	. 6	. 1
11	411	1. 1	1. 6	. 0	. 1	. 1	. 0
12	192	1. 1	1. 5	. 0	-----	-----	. 0
13	34	2. 1	3. 1	. 1	-----	-----	-----
4th Treatment Series							
5-13	3, 298	0. 9	1. 4	0. 0	0. 8	1. 7	0. 1
5	83	. 0	. 0	-----	1. 6	3. 0	. 0
6	452	. 2	. 3	-----	2. 2	4. 5	. 2
7	527	. 7	. 9	. 0	2. 0	4. 3	. 2
8	467	. 8	1. 1	. 0	1. 2	2. 4	. 2
9	486	1. 0	1. 5	. 0	. 3	. 7	. 1
10	482	1. 0	1. 5	. 0	. 0	. 1	. 1
11	521	1. 1	1. 6	. 0	. 0	. 0	. 0
12	237	1. 4	2. 1	. 0	. 0	. 0	. 0
13	43	2. 3	3. 4	. 0	-----	-----	. 0

Table 5. Dental treatment to permanent and primary teeth of Negro children, 5 to 13 years old, all treatment series, by age, Gainesville, Fla., 1954-59

Age last birthday	Number of children treated	Number of teeth per child					
		Permanent teeth			Primary teeth		
		Filled	Filled surfaces	Extracted	Filled	Filled surfaces	Extracted
1st Treatment Series							
5-13	1, 179	2.1	3.1	0.1	0.0	0.0	0.2
5	3						.3
6	166	.6	.9	.0			.1
7	191	.9	1.2	.0			.2
8	200	1.6	2.1	.0	.0	.0	.3
9	173	1.9	3.0	.0	.0	.0	.5
10	152	2.4	3.7	.2			.3
11	159	2.9	4.2	.2			.1
12	102	3.8	5.8	.2			.2
13	33	4.5	6.7	.3			
2d Treatment Series							
5-13	1, 255	1.0	1.4	0.0	1.0	2.0	0.3
5	44	.2	.2		1.4	2.8	.1
6	186	.3	.4		2.3	4.3	.3
7	200	.5	.7	.0	2.5	4.8	.4
8	228	.7	.9	.0	2.1	4.3	.6
9	191	.9	1.3	.0	.7	1.4	.6
10	174	.8	1.1	.0	.0	.1	.3
11	143	1.3	1.8	.1	.0	.0	.2
12	56	1.6	2.2	.1			.1
13	33	2.5	3.6	.1			.1
3d Treatment Series							
5-13	1, 519	0.7	1.0	0.0	0.8	0.6	0.1
5	117	.0	.0		2.0	3.8	.1
6	198	.1	.2		2.0	4.0	.2
7	227	.3	.4	.0	1.7	3.4	.3
8	225	.5	.7	.0	1.1	2.1	.3
9	227	.6	.8		.3	.7	.2
10	212	.7	1.0	.0	.0	.0	.1
11	169	.9	1.4	.0			.1
12	113	1.3	1.7	.0			
13	31	1.8	2.5	.1			
4th Treatment Series							
5-13	1, 369	0.5	0.7	0.0	0.3	0.7	0.0
5	1						
6	144	.2	.3		1.9	3.9	.1
7	210	.3	.4		1.1	2.2	.0
8	240	.3	.4	.0	.0	.1	.1
9	228	.4	.5	.0	.0	.1	.1
10	199	.4	.6	.0			.0
11	185	.6	.9	.0			.0
12	114	.9	1.2				.0
13	48	1.3	2.0				.0

Fluoridation had started in 1949, 4 years and 2 months before the first clinic care was started. It had been in effect 5 years and 7 months before the last child was given first series treatment 17 months later. Thus we have assumed that the average period of using fluoridated water in the first treatment series was 5 years.

Because many cities in which similar school dental care programs might be conducted have started fluoridation in recent years, some knowledge of use of fluoridated water by Gainesville children at the time of this study is pertinent. Years of using fluoridated water since 1949 are shown in table 6 for participants in the first series, by age and race.

One-fourth of the white 5-year-olds had been resident since birth and had used only fluoridated water. Approximately one-third of each of the other age groups had used fluoridated water since its introduction in Gainesville. Naturally, its effectiveness would be expected to decrease with age, since 6-year-olds were aged 1 when water fluoridation was started and 12-year-olds were aged 7—beyond the time in which major benefits could be derived. Approximately another third of the children at each age

had never been resident on fluoridated water. Most of them attended the Gainesville school system but used water from individual wells at home. The remaining third had used fluoridated water for periods of less than 5 years.

The proportion of Negroes who used Gainesville fluoridated water for a full 5 years was higher, averaging 54 percent for all ages. Between one-fourth and one-third had never lived on fluoridated water, and the remainder had used it from 1 through 4 years.

Treatment Time

The number of months required to complete each of the four treatment series was 17, 18.5, 16, and 14, respectively. The second series, which took the longest, had the heaviest workload. Although the number of children treated in the second series was no greater than in the first, 38 percent of those treated were new to the program. Moreover, a backlog of need in primary teeth, the bulk of which was cared for in this round, accounted for a large part of the workload.

If the influx of new participants had been

Table 6. Percent distribution of white and Negro children, 5 to 12 years old, first treatment series, by use of fluoridated water, Gainesville, Fla., 1954

Approximate years of using Gainesville fluoridated water ¹	Percent of children, by age ²								
	5-12	5	6	7	8	9	10	11	12
<i>White</i>									
5.....	35	23	37	35	35	33	32	39	38
4.....	5	23	6	5	5	6	4	4	5
3.....	6	6	8	7	6	5	4	7	4
2.....	8	12	10	8	9	8	7	6	7
1.....	13	12	11	11	14	13	16	12	15
0.....	33	24	28	34	32	35	37	32	31
Total.....	100	100	100	100	100	100	100	100	100
<i>Negro</i>									
5.....	54	34	49	56	52	51	56	54	61
4.....	4	33	4	5	3	3	5	6	3
3.....	3	0	5	3	4	4	3	3	1
2.....	4	0	5	4	4	5	5	1	0
1.....	7	0	6	6	8	7	7	6	10
0.....	28	33	31	26	29	30	24	30	25
Total.....	100	100	100	100	100	100	100	100	100

¹ Maximum possible use estimated at 5 years. Water had been fluoridated for 4 years and 2 months when the study was started. The first treatment series lasted 17 months. The midpoint in range from 4 years, 2 months to 5 years, 7 months is approximately 5 years.

² Number too small at age 13.

Table 7. Comparative data for three school dental care programs, Gainesville, Fla., Richmond, Ind., and Woonsocket, R.I.

Location	Treatment series			
	First	Second	Third	Fourth
Number of DMF permanent teeth per 8-year-old white child:				
Gainesville, Fla.	2.4	2.0	1.7	1.4
Richmond, Ind.	2.9	3.2	2.9	2.8
Woonsocket, R. I.	3.9	4.2	3.8	3.6
Percentage of new patients among total patients:				
Gainesville, Fla.	100	38	39	26
Richmond, Ind.	100	35	22	17
Woonsocket, R. I.	100	48	23	19
Dentist man-hours, per child:				
Gainesville, Fla.	0.8	0.8	0.5	0.5
Richmond, Ind.	2.9	1.9	1.2	.8
Woonsocket, R. I.	3.3	2.8	1.7	1.4
Children for whom treatment was completed, per dentist-year:				
Gainesville, Fla.	1,270	1,303	2,031	1,867
Richmond, Ind.	530	743	1,009	1,343
Woonsocket, R. I.	384	470	714	848

smaller in the third and fourth treatment series, the time required to complete these phases would have been much less. Two-fifths of the children in the third series and one-fourth of those in the fourth series were enrolled in the program for the first time.

Treatment time per child averaged 45 minutes in the first two series and 30 minutes in the final two rounds. In the first series, a dentist was able to care for 1,270 children in 12 months. By the third series, the completion of backlog needs and the reduction of the treatment requirements of many children to an annual maintenance basis resulted in the treatment of more than 2,000 children per dentist-year, an increase of nearly 60 percent. In the fourth series, a larger number of teeth required filling, and fewer children could be treated per dentist-year.

Comparative Data

To assess the treatment needs and resource requirements in Gainesville as compared with the two other communities in which similar studies were conducted, comparative data have been compiled.

In Richmond and Woonsocket, children through age 16 were offered treatment, while in Gainesville few children older than 13 were included in the program. In Gainesville, treatment was offered only in the elementary schools,

and since the backlog of dental care needs was smaller in younger children, the workload was lighter in this study.

That workload levels might be expected to be lower in Gainesville is apparent also from DMF prevalence rates. When the studies were started the prevalence rate among 8-year-old white children was half a tooth less than in Richmond and 1½ teeth less than in Woonsocket (table 7).

While dental caries prevalence rates varied from series to series in Richmond and Woonsocket because of admissions and discharges to the different groups, regularly administered topical fluoride applications, and some prophylactic odontotomy, they remained relatively unchanged throughout the study periods. In Gainesville, the steady and continual reduction in rates resulting from fluoridation of the water supply is evident. The dental caries prevalence rate in the final series is more than 40 percent less than the rate in the first series.

A single counteracting factor conflicted with the advantages that brought about treatment of more children in Gainesville. Since all elementary school children were treated in each series, there were substantial backlog requirements to be completed in all treatment rounds. The new patient load in the third and fourth series (39 percent and 26 percent, respectively, of total patients) was considerably higher than had been experienced in Richmond and Woonsocket.

Results indicate that the number of children who could be given complete treatment per dentist-year is higher in Gainesville, twice that in Richmond and three times that in Woonsocket during the first series. By the fourth series, however, the number of children completed per dentist-year had increased by only half in Gainesville as compared with a 2.2-fold increase in Woonsocket and a 2.5-fold increase in Richmond.

In Richmond and Woonsocket approximately 3 dental hours were required per child in the first treatment series, four times that in Gainesville. By the concluding treatment series, a child in Gainesville was treated in half an hour, in Richmond in three-fourths of an hour, and in Woonsocket in an hour and a half.

The dental resources needed to carry out a maintenance dental care program for Gainesville could not have been forecast from the knowledge previously supplied by experience in Richmond and Woonsocket. The variety of unique circumstances in Gainesville which caused the observed differences may enable more careful planning of a similar study in a comparable situation.

Summary

From 4,400 to 5,400 school children in grades one through six, ranging in age in most part from 5 to 13 years, were given complete dental care in each of four treatment series of the school project conducted in Gainesville, Fla., from 1954 to 1959. Kindergarten children were examined and treated as time permitted.

1. A movable clinic building, specially constructed for the purpose, was transported from one school to another and affixed to permanently installed plumbing and utility lines.

2. Average participation of about 88 percent of the total school population was attained in all series, 84 percent among white children and 98 percent among Negro children.

3. Negro children were found to have one-third fewer decayed, missing, or filled teeth (DMF) on first examination, creating a smaller backlog of needed dental care than among white children.

4. Controlled fluoridation had been underway

for 4 years and 2 months when the study began. In the first treatment series, 35 percent of the white children and 54 percent of the Negro children had about 5 years residence on fluoridated water. The effect of fluoridation was evident in steadily decreasing DMF rates measured in successive treatment series.

5. Treatment needs were reduced from an average of more than two filled teeth per child in the first treatment series to 0.7 filled tooth per child in the final series.

6. The relatively transient population of Gainesville resulted in larger numbers of new patients entering the program in the later treatment series than was true of the Richmond or Woonsocket school dental care studies. Two-fifths of children treated in the third round and one-fourth of those treated in the final series were new to the program.

7. Treatment time in Gainesville was less than had been observed in the earlier school dental care studies, three-fourths of an hour for each child in the initial series, decreasing to half an hour in the final series.

8. In the first treatment series, an average of 1,270 children were completely treated per dentist-year. By the last series, the ratio had increased to half again as many children.

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